

Dietary and Lifestyle Patterns of Patients with Diabetes and their Association with Obesity in Central India

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Abstract

Context: Diabetes mellitus (DM) presents a significant worldwide public health challenge of epidemic proportions, and its incidence is rising, becoming a prominent cause of mortality in most nations. Diabetes has a multifaceted aetiology in India and encompass a variety of factors, including genetic and environmental variables such as obesity in connection to rapid urbanization, and lifestyle changes.

Aims: This study is focused on the dietary and lifestyle patterns of Diabetes patients and their association with Obesity in central India.

Methods and Material: This study was conducted as a descriptive cross-sectional survey of diabetic patients visiting the special medical clinics at the Apollo hospital, Indore, a tertiary care hospital of Central India.

Results: Overall, 385 participants were enrolled in this study out of which 198 were females (51.4%) and 187 (48.6%) were males. The majority of population belonged to middle age group (35-65 years) showing a mean age of 48.24 years. The mean weight and BMI of the population was 73.415 kg and 28.122 respectively. Out of the 385 participants maximum were obese (72.47%). 279 (72.47%) mentioned that they eat while watching TV, from this group 55.06% were seen to be obese. A majority (258) accounting for 67.01% were vegetarian, out of them 49.35% were obese. 24.93% males are physically active.

Conclusions: Our study's findings indicate that the adoption of lifestyle modifications among type 2 DM patients visiting a Tertiary Care Hospital was notably low. Additionally,

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we observed that the dietary restrictions necessary for these patients were not considered adequate.

Keywords: Diabetes; Obesity; Dietary Patterns.

Key Messages: (1) The balance of food, exercise, and prompt medication is the cornerstone of diabetes treatment. (2) Dietary behaviour is a core element in diabetes self-management. (3) Females, Nuclear families, vegetarians, Watching TV while eating are more Obese in this study population with diabetes.

INTRODUCTION

An estimated 41 million people (approximately 71%) die due to non-communicable diseases (NCDs) globally which makes NCDs the leading cause of death worldwide. Cardiovascular diseases, cancers, respiratory diseases, and diabetes alone is responsible for 80% of fatality making these the top four killers.¹ The unprecedented rise of Diabetes mellitus has propelled it to become the leading cause of human deaths in most countries and is being perceived as a global health concern of epidemic proportions. In 2021, the International Diabetes Federation (IDF) estimated 537 million diabetics aged between 20-79 years. The number is anticipated to rise to a colossal 643 million and 783 million by 2030 and 2045 respectively. What is alarming is that an estimated 240 million people (nearly half) of the affected people are unaware of their condition and are left undiagnosed. The fact is that 90% of the affected people reside in countries with low to middle income.²

The scenario in India is similar. About 69.9 million people are estimated to be affected by diabetes by 2025, and a vast majority are undiagnosed.^{3,4} It is a rapidly growing health concern and potential epidemic in India.³ The environmental variables such as obesity linked to rising living standards, rapidly increasing migration, and lifestyle changes, lack of balance in food consumption and exercise has triggered the altering of the physiological milieu leading to diabetes.^{3,4} The balance of food, exercise, and prompt medication is the cornerstone of diabetes treatment.⁵ This study attempts to focus on the dietary patterns of Diabetes patients in central India.

SUBJECTS AND METHODS

This study was conducted as a descriptive cross-sectional survey of diabetic patients visiting the special medical clinics at the Apollo hospital, Indore, a tertiary care hospital in Central India. This study included diabetics who attended the medicine outpatient department between the period of April 2022 to August 2022. Variables such as Demographics, Anthropometric measures, dietary such as eating outside, frequency, food habits (Vegetarian/Non-vegetarian), family type, oil consumption, physical activity and its duration, and Eating and watching Television were captured using a questionnaire. Informed consent was obtained from all the study participants prior to

enrolment in the study and all measures to maintain privacy and confidentiality were followed to rule out any possible bias during the data collection process. The data collected in the questionnaires were entered into Spreadsheet and analyzed via Minitab version 16.0 statistical software. Results are presented as proportions and a multivariate regression analysis was done with a p-value <0.05 for statistical significance.

Case Definitions

According to the diagnostic criteria of WHO, the prevalence of diabetes mellitus (DM) has been defined as a measurement of Fasting blood glucose (FBG) ≥ 126 mg/dl or self-reported history of diabetes and impaired FBG has been defined as 100–125 mg/dl.¹² Self-reporting adults were categorized as already diagnosed or aware of their diabetes condition. On the other hand, individuals who had fasting blood glucose (FBG) levels equal to or higher than 126 mg/dL during the survey but had not self-reported were classified as newly diagnosed cases of DM. Anthropometric measurements like height (cm) and weight (kg) were recorded. Body mass index (BMI) was calculated as body weight (kg)/ height (m)². The World Health Organization criteria was used to classify adults as underweight, overweight, and obese based on their BMI.

RESULTS

Overall, 385 participants were enrolled in this study out of which 198 were females (51.4%) and 187 (48.6%) were males.

Table 1: Demographics of study population

Variable	Mean	St. Dev
Age	48.242	13.297
Height	161.35	9.22
Weight	73.415	14.464
BMI	28.122	5.135

According to the results of a total of 385 participants, 22.85% belonged to the age group 30-39 years, 22.59% belonged to 40-49 and 50-59 years, 17.4% belonged to 60-69 years, 7.53% belonged to 20-29 years, 6.49% belonging to 70-79 years and only 0.25% belonging to <20 and between 80-89 years respectively. The majority of the participants (85.5%) belong to the age group between 30-69 years. The mean age calculated for the participants is 48.24. The mean height calculated was 161.35 cm and the mean weight of the participants was 73.415 kg while the BMI mean was 28.12.

OBESITY

1. Overall Obesity

72.47% of the total study population were found

to be obese showing that almost 3/4th of the participants were obese. 13.5% were overweight whereas only 2.6% were underweight, and 11.43% of the study population were of normal weight.

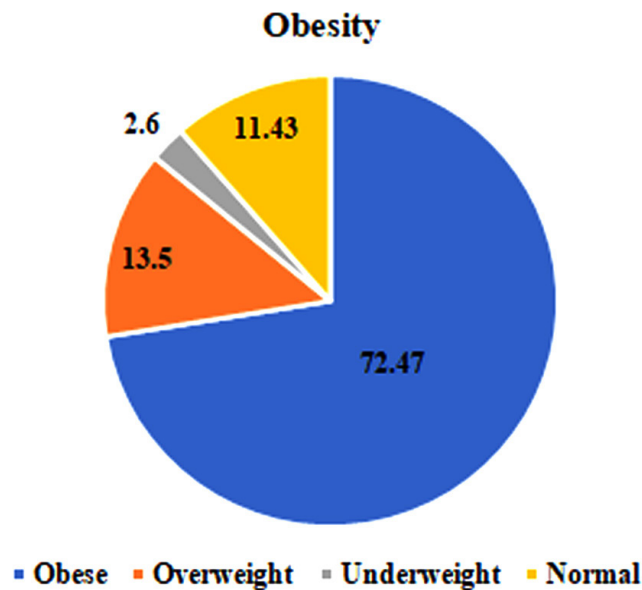


Fig. 1: Obesity of study population

2. Gender and Obesity

The graph below shows that more of the female population (40.77%) were obese compared to their male counterparts (31.68%). 8.05% of the male

population was overweight compared to 5.45% of the female population. 7.53% of the male and 3.89% of the female population was of normal weight. Only 1.29% of each gender were underweight.

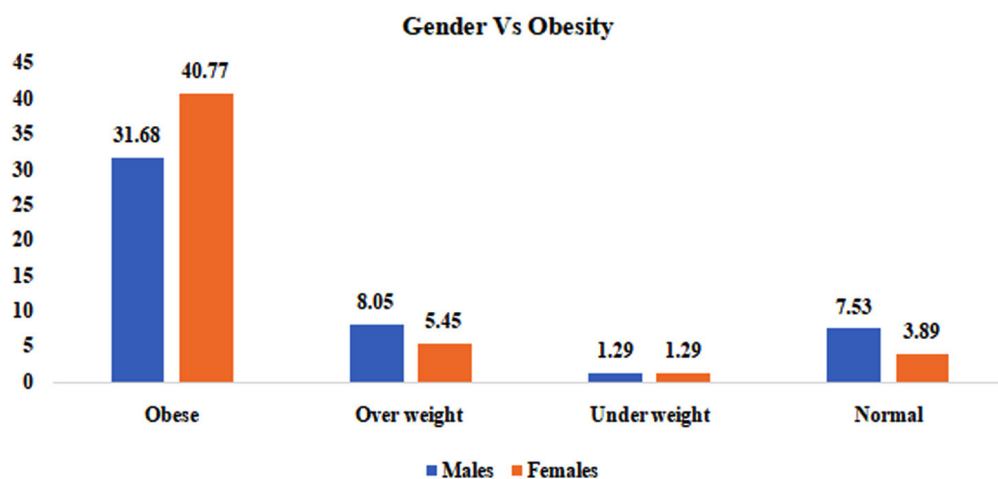


Fig. 2: Gender differences and Obesity of the study population

3. Family type and Obesity

The participants were divided into two groups

based on the type of family. 113 participants (29.35%) were living in a joint family whereas 272 (70.65%) were living in nuclear families.

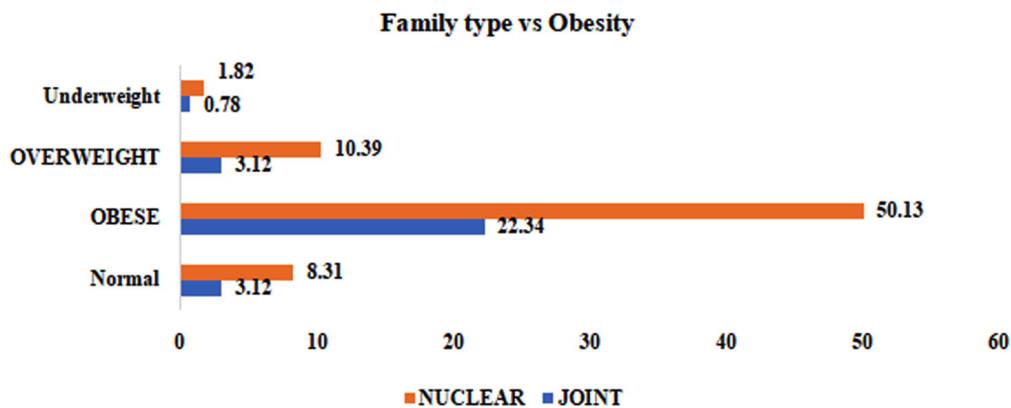


Fig. 3: Association of Obesity and Family type of the study population

From the graph above it could be inferred that there is no significant difference when it comes to the correlation between family type and diabetes. Of the 72.47% of the obese population, 50.13% belonged to nuclear families whereas 22.34% belonged to joint families. Similarly, 10.39% of the overweight population belonged to nuclear families, and 3.12% belonged to joint families. Although it has to be borne in mind that the population distribution is larger in the nuclear family category (*i.e.*, 70.65%).

4. Food habits and Obesity

Among the study population, the majority (67.01%) were vegetarian, 29.87% were non-vegetarian and only 3.12% were egetarians.

49.35% of the vegetarians were obese, 9.61% were overweight, 6.49% were normal weight, and 1.03% were underweight. Amongst the non-vegetarian participants, 20.77% of them were obese, 3.11% were overweight, 4.93% were normal weight and 1.55% were underweight. It was observed that the percentage of overweight and obese non-vegetarians was slightly lower than vegetarians.

5. Eating & Watching TV and Obesity

Of the total participants, 72.47% (39.22% females and 33.25% males) watched TV while eating. The association between Eating and watching TV and Obesity was shown in Fig. 4.

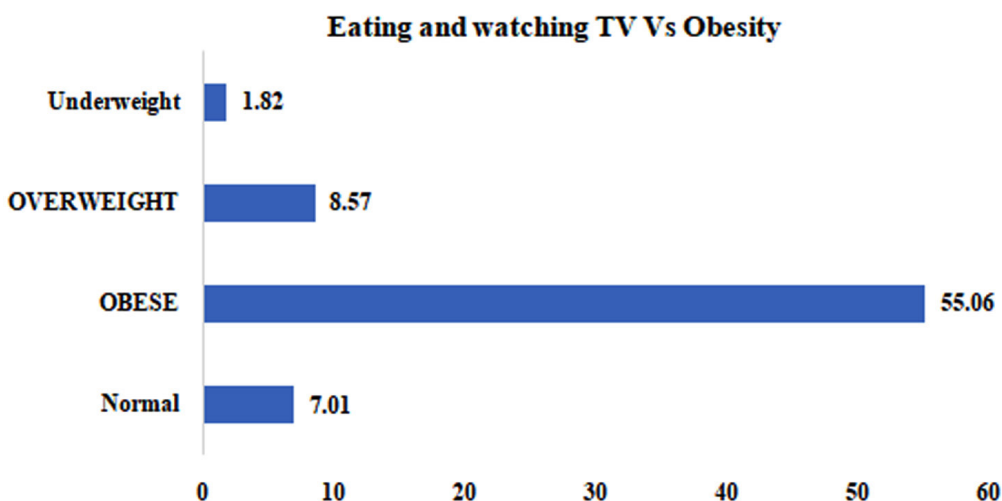


Fig. 4: Association of Eating and Watching TV and the Obesity of study population.

DISCUSSION

Diabetes mellitus is a chronic metabolic disease with known etiological causes including stress, unhealthy eating habits, physical inactivity, and poor dietary patterns. According to the WHO report in 2018, the prevalence of diabetes has been rising drastically in middle and low income countries. Diabetes is one of the major causes of blindness, renal failure, heart attacks, stroke, and lower limb amputation.

India is considered one of the most diverse countries globally with a population of more than 1.3 billion people. India not only has a diverse population in terms of culture but also in terms of the food it consumes, as well as socioeconomic differences and other factors.⁶ It is also well known that different parts of India have diverse food consumption patterns. In addition to variations in the consumption of main cereals like rice or wheat, there are differences in the intake of the quantity of milk, milk-based food items, and meat consumption across the regions of India.

Diet influences the quantity of insulin required to meet the target of blood glucose for maintaining optimal blood glucose levels in the body. The dietary pattern, especially the intake of carbohydrates could contribute to the pathophysiology of diabetes. Dietary carbohydrates are the main determinant of insulin levels that are associated with diets and have a significant impact on postprandial blood glucose levels. It has been observed that a low carbohydrate ketogenic diet reduces the damaging consequences of diabetes effectively.⁷

Management of diabetes is complicated and crucial, and it demands health risk reducing methods in addition to control of blood sugar levels.^{8,9} Eating healthy, which includes minimizing the amount of high sugar meals, and high-fat foods, maintaining portion sizes, consuming more vegetables, restricting carbohydrate foods, and avoiding fast food, has been demonstrated to help people maintain low HbA1c levels.^{10,11}

There is a significant correlation between the health status of populations and their dietary consumption of nutrients. Dietary patterns determine the combination of food items consumed by individuals. Analyzing dietary patterns provides more comprehensive insights compared to analysis of single nutrient intake and hence are used more often in nutritional epidemiological research.

Food hardship, deficient sanitation, illiteracy,

and the prevalence of infectious diseases may all play a cumulative role, indicating that policymakers and local governments are undermining and not prioritizing the emergence of diabetes threat or addressing it effectively.¹²

The present study aims to describe the dietary patterns of diabetics in Central India. The majority of the respondents were 30-39 years but the respondents in the studies of Deepashree, Shrivastav, Adebisi *et al* were more than 40 years.¹³⁻¹⁵ It is a well-known fact that obesity may lead to increased insulin resistance and diabetes prevalence in the Indian population. In the present study, the percentage of obese women (40.78%) was more than that of men (31.69%) and, the majority of the participants were either overweight or obese. Similarly in other studies by Oladapo *et al.* and Shrivastav *et al*, it was found that a higher percentage of females were obese than males (11.1% and 55% respectively).^{16,14}

Physical activities considerably help in reducing blood sugar levels. The ADA guidelines have recommended physical activity for the elderly including moderate exercises like brisk walking for at least 3-5 days per week for approximately 150 minutes per week.¹⁷ In this current study, 47.79% were physically active and males (24.93%) were more physically active than females (22.85%) but not significant. Most of these participants were involved in physical activity daily (24.67%), 11.68% were physically active on alternate days, and 11.42% on 3-5 days a week respectively.

In this study, vegetarians (49.35%) were found to be more obese than non-vegetarians (20.77%). Nuclear families (50.13%) showed results of more obesity than Joint families (22.34%). 55.06% of obese participants were found eating while watching TV of which 39.22% were females and 33.25% were males. 54.28% of study participants had a habit of eating outside. The average consumption of oil per person is 1.14 liters per month.

The limitations of this study are that data is collected from a single center, and important measurements of anthropometrics such as hip ratio, history of diabetes duration, other comorbidities, type of food consumption, laboratory investigations, treatment details, etc. are not collected in this study.

CONCLUSION

The observations in our study revealed that the practice of the required lifestyle modifications

as a part of disease management among type 2 DM patients visiting a Tertiary Care Hospital was considerably low and the dietary restrictions required for the patients were found to be inadequate. Following a healthy lifestyle, weight management, and eating a balanced diet shall improve a patient's health enormously. It is important to educate and counsel the patients regarding all the aspects of diabetes and create the required awareness. Periodic prevalence estimates, awareness, treatment, and control levels as well as future projections for diabetes are necessary to promote its prevention and encourage quality care. Constant monitoring and surveillance programs for diabetes as well as comprehensive health promotive and management interventions among diabetics are important for the progress of countries to achieve the WHO Global NCD Voluntary Targets by 2025.

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